

Correlates of Smoking Behavior among Muslim Arab-American Adolescents

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ABSTRACT

Objectives. *Although ethnic and gender differences in adolescent smoking have been well documented, factors influencing susceptibility to smoking and experimentation among the ethnic group of Muslim Arab-American youth have received little research attention. This study examines the smoking prevalence, the associations of known smoking risk factors, religious and cultural influences with adolescents' susceptibility to smoking and experimentation with cigarettes among the ethnic group of Muslim Arab-American adolescents, in an Islamic Academy in Fairfax County, Virginia.*

Design. *Cross-sectional survey data collected confidentially from a sample of 480, 7th to 12th grade students in Fairfax County, Virginia, during the 1998–99 school year. Outcome measures included self-reported susceptibility to smoking and smoking behavior.*

Results. *The overall prevalence of susceptibility to smoking, experimentation (ever smoking), 30 day and current smoking was 50%, 45%, 18% and 12%, respectively. Almost twice as many males as females were susceptible to smoking and reported to have experimented with cigarettes. Peers smoking was the most significant risk factor associated with both susceptibility and experimentation for both genders (OR = 3.0, 95% CI = 1.8–4.5; OR = 3.0; 95% CI = 1.8–4.6, respectively), while perceived peer norms were a risk factor for ever smoking but not for susceptibility to smoking. Religious influence and perceived negative consequences of smoking were protective against ever smoking for both genders (OR = 0.7, 95% CI = 0.5–0.9; OR = 0.8, 95% CI = 0.7–0.9, respectively). Culturally based gender-specific norms were significantly associated with increased risk of susceptibility to smoking for males only (OR = 3, 95% CI = 1.3–7), while religious influence was protective against susceptibility to smoking for females only (OR = 0.6, 95% CI = 0.4–0.8).*

Conclusion. *Social influences-based smoking prevention programs may be effective for adolescents from Muslim Arab cultures; however, they should be modified to address culturally based gender norms and may benefit from the incorporation of Islamic messages denouncing smoking behavior.*

Keywords: smoking, Muslims, religiosity, Arab-American adolescents, gender roles

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INTRODUCTION

Smoking has been well established as the major preventable cause of premature death and disability (Centers for Disease Control and Prevention 1996, 1997, 2000). Despite an overall decline in adult cigarette smoking in the USA (Fiore *et al.* 1989; Pierce *et al.* 1989), smoking rates for American adolescents remain quite high (Centers for Disease Control and Prevention 1999, 2000). Since most smoking behavior is initiated during adolescence (Lee *et al.* 1993), understanding the risk factors for initiation of smoking among adolescents is an important tool in designing effective smoking prevention programs.

The prevention of smoking among adolescents has received substantial attention in the USA since 1964, when the US Surgeon General's report on smoking and health was published (US Department of Health and Human Services 1964). Results of the numerous studies conducted in the past few decades point to a combination of risk factors, which include demographic characteristics, social, intrapersonal and psychosocial factors, including knowledge, attitudes and beliefs (Baugh *et al.* 1982; Flay *et al.* 1983; Gilpin and Pierce 2001).

Demographic characteristics predictive of smoking include older age, lower socioeconomic status and being male (Brownson *et al.* 1992; Centers for Disease Control and Prevention 2000). Peers' smoking, perceived peer norms, as well as parental and sibling smoking were found to be positively associated with adolescent smoking (Chassin *et al.* 1981; Presson *et al.* 1984; Hansen *et al.* 1987; Conrad *et al.* 1992; Fisher *et al.* 1993; Cohen *et al.* 1994; Flay *et al.* 1994; Biglan *et al.* 1995; Wang *et al.* 1995; US Department of Health and Human Services 1998). Knowledge of the negative consequences of smoking appears to be protective (Mermelstein 1998; Centers for Disease Control and Prevention 2000), while positive beliefs and attitudes about the potential benefits of smoking increase the likelihood of future smoking (Ajzen and Fishbein 1980; Brownson *et al.* 1992; Conrad *et al.* 1992; Greenlund *et al.* 1997; Centers for Disease Control and Prevention 2000; Tony *et al.* 2001).

Previous studies have shown that the onset of smoking is a time-dependent four-level process that includes a preparation period, where some adolescents may be more susceptible to smoking than others, an early experimentation period, where adolescents do try smoking at least once, a more advanced regular but non-daily smoking period, and, finally, a stable level of addiction to cigarettes (Flay *et al.* 1983; Elder *et al.* 1990; US Department of Health and Human Services 1994). The concepts of susceptibility and experimentation to smoking differ such that a susceptible adolescent is one who does not adamantly rule out the possibility of smoking in the near future, whereas an experimenter adolescent is one who has already tried smoking at least once in his/her lifetime and may be susceptible to future smoking if the occasion arises. Previous longitudinal research has shown an increased likelihood of future smoking among never smokers who do not adamantly rule out the possibility of smoking a cigarette in the near future (susceptible adolescents) (Pierce *et al.* 1996, 1998). During the early middle school years (12–13 years), most children have not yet tried a cigarette and many may strongly assert that they will not be future smokers, and thus would be considered unsusceptible to smoking (Choi *et al.* 1997). However, as they get older (15 years and older), many may change their attitudes and may no longer be prepared to rule out the possibility of trying smoking and, therefore, become more susceptible to begin to experiment with cigarettes (Choi *et al.* 1997; Pierce *et al.* 1998). Although not all adolescents who experiment with smoking will go on to become addicted, experimentation is a necessary step for the eventual smoking uptake process (Chassin *et al.* 1996; Pierce *et al.* 1996, 1998; Choi *et al.* 1997; Unger *et al.* 1997). Accordingly, smoking prevention programs should either prevent target groups from becoming susceptible to smoking or prevent susceptible adolescents from progressing to experimentation with cigarettes (Pierce *et al.* 1996). The

question of whether factors influencing adolescents' susceptibility to smoking are similar or different from those influencing experimentation remains to be investigated.

The majority of studies on smoking initiation risk factors focused primarily on white youth (Mermelstein 1998) and, as a result, we know much less about how these risk factors may differ among the ethnic and gender subgroups. Results of population-based studies in the USA have indicated different rates of smoking prevalence and patterns of tobacco use across different ethnic groups (Escobedo and Remington 1989; Escobedo *et al.* 1990; Chen and Unger 1999; Chen *et al.* 1999). Most of these studies have reported that some of these differences may be explained by variations in each group's societal and cultural expectations and attitudes, family influences vs peer influences, normative behaviors and perceptions of the positive and negative consequences of smoking (Escobedo *et al.* 1990; Conrad *et al.* 1992; Freeman 1993; Heath *et al.* 1993; Adler *et al.* 1994). Other research has suggested that gender may shape health-related behaviors, particularly during adolescence (Verbrugge 1983), when perceived cultural norms about gender roles and relations emerge within the adolescent peer group (Kaplan 1997; Maccoby 1998). Previous studies have found gender differences in susceptibility to social influences (Chassin *et al.* 1986), level of social skills (French and Perry 1996), and reliance on smoking as a coping strategy (Fried 1994).

One rapidly growing ethnic group in the USA for which there seems to be little or no data on its smoking behavior is the Arab-Americans. It is estimated that nearly three million Americans trace their roots to an Arab country (Arab American Institute 2001). Arab-Americans trace their original homelands to 22 Arab countries, stretching from Morocco in the west to the Arabian (Persian) Gulf in the east (Samhan 2001). The majority of Arab-Americans descend from the first wave of mostly Christian immigrants. However, owing to the steady increase of Arab immigration since the 1950s, Arab Muslims represent the fastest growing segment of the Arab-American community (Samhan 2001). Although a highly diverse group, Arab-Americans descend from a heritage that represents common linguistic and cultural traditions (Samhan 2001).

Rationale for Studying the Influences of Islamic and Gender-specific Norms on Smoking Behavior

Religion in many societies plays a key role in the education of its followers and has major influence on their lifestyles and behavior (Dittes 1969), especially in Islamic societies (Haynes 1994). Islam is a way of life. It is a religion that prescribes laws on how people should act and live and therefore shapes many of the social, psychological and behavioral attitudes of Muslims (Al Faruqi 2001; Beveridge 2001). Religious education starts very early in life and is part of the educational curriculum for all grade levels in most Muslim countries (Starrett 1998). Therefore, religious teachings and influences may reach the youth not only through religious establishments and organizations but also through the formative years of education (Denny 1993; Starrett 1998).

There are a number of social behaviors that are considered to have detrimental effects on the well-being of humans, such as alcohol consumption and premarital sex, that are forbidden in Islam. Other detrimental behaviors that have not been forbidden may either be considered as hated behaviors and frowned upon, or a religious ruling (Fatwa) may be issued to deal with the consequences of the behavior in question (Denny 1993; Ingram 1999). Fatwas are religious rulings/statements that are collectively agreed upon by the authorized religious leaders of the Muslim country. They are issued to deal with behaviors that have not been specifically and literally referenced in either the Qu'ran (the Muslims' holy book) or the Sunna (the teachings of the prophet Mohamed), and are expected to be followed by all Muslims. However, Fatwas issued in one Muslim country may not necessary be followed by Muslims in other countries, if their religious leaders have not also issued or supported the same Fatwa. The use of illegal drugs is one such

unanimous Fatwa, which is now considered a sin just as much as alcohol consumption is, in all Muslim countries (Fernea 1991; Ingram 1999; Al Faruqi 2001).

Smoking has never been forbidden in Islam. However, because of its detrimental effect on health, some Muslim countries such as Egypt have recently (in 1999) issued a Fatwa, stating that smoking is now considered a sin in Islam just as alcohol and illegal drugs are (WHO-EMRO 2001), while other Muslim countries, such as Saudi Arabia, have declared that it is a hated behavior and should be avoided at all costs (WHO-EMRO 2001). Whether these declarations have an influence on Muslim youth's susceptibility and/or experimentation with smoking may depend largely on the youth's perceptions of the effectiveness of religious influences.

Islamic societies are collective societies, where the family unit is more important than the individual (Abd Al Hameed and Al Sheikh 1978). One of the Islamic traditions is the advocacy of an extended rather than a nuclear family system. Some Muslim families live communally with three or more generations of relatives (grandparents, parents, uncles, aunts, and their offspring) in a single building or compound. Even when this residential version of the extended family is not possible or adhered to, family connections reaching far beyond the nuclear unit are evident in strong psychological, social and economic ties (Al Faruqi 2001).

Islam also influences what is considered proper behavior between men and women. Gender segregation and differentiation is emphasized. Islam outlines specific roles for believing men and women into a complementary dichotomous relationship (Abd Al Hameed and Al Sheikh 1978; Moussa 1992; Al Ansari 1996). Women are expected to exhibit Islamic feminine characteristics such as modesty, kindness, passiveness, obedience to family and spouse, and contentment with bearing and rearing children. Men are expected to repudiate all feminine characteristics, exhibit virility, bravado, toughness, and financial responsibility to family and emotional support to friends.

Because of these religious and cultural factors, one would expect different social risk factors to affect Muslim Arab-American adolescents' smoking behavior. Arab-American Muslim male youth may be at increased risk of smoking because of expectations that are reinforced through the broader socio-cultural attitudes of their mainstream society. These might include beliefs that smoking helps promote an image of maturity, bravery, toughness and masculinity, characteristics that are idealized in that culture. In contrast, cultural norms for Arab-American Muslim female adolescents may be protective since there is strong sentiment among Muslim populations that smoking is not appropriate for girls, is unladylike, and may ruin a girl's reputation and prospects for marriage. Thus, Muslim Arab youth in America may have religious-based cultural norms that are unique to their faith and that may affect their smoking behavior.

A better understanding of which factors influence susceptibility and experimentation among Muslim Arab-American adolescents may aid in designing appropriate smoking prevention programs aimed at preventing this group from becoming susceptible to smoking or prevent susceptible adolescents from progressing to experimentation.

The current study was conducted to investigate the association of known social risk factors of smoking (peer and family influences, positive beliefs about smoking and perceived negative consequences), culturally specific gender norms and religious influence with adolescents' susceptibility to smoking and experimentation with cigarettes among Muslim Arab-American adolescents in grades 7 to 12, in an Islamic Academy in Fairfax County, Virginia.

METHODS

Data Sources

An Islamic academy in Fairfax County, Virginia, was selected to participate in this

study. Fairfax County, Virginia, ranks among the top 10 counties in the USA with regards to the Arab-American population (nearly 35,000) (US Census Bureau 2000). This school was selected because the enrolled students are Muslims of Arab descent. The Academy is an accredited bilingual English–Arabic school with a dual American and Middle Eastern curriculum that incorporates Islamic and Arabic teachings in its curriculum. It is a private Islamic school serving students from pre-kindergarten through high school, and is subsidized by the Saudi Arabian government, allowing all levels of socio-economic statuses to be enrolled. Girls and boys from 3rd grade (8 years) through high school are segregated into two different buildings in the same school grounds.

The data were obtained from all consenting students in grades 7 (aged 12–13 years) through 12 (17–19 years). This wide age range was selected to be able to include adolescents during all four periods of smoking, from the early middle years of the preparation period where susceptible adolescents may be present, through the senior years where the final period of addiction to nicotine may have been established.

The data were collected during regular classroom hours in the 1998–99 school year. A written survey questionnaire, with questions in either a Yes/No format or in a 1–4-point response scale (Totally disagree–Totally agree), was administered by the author, a trained health educator, and a data collector, not otherwise associated with the school. Prior to the beginning of the survey, the purpose of the survey was explained to students. No identifying information linked students to the survey. All students' responses were anonymous. Consent forms were sent to parents of all students. Parents were instructed to sign and return the consent form if they consented to their child's participation. Students were allowed to decline participation at any time. The study was approved by the University of Southern California Institutional Review Board (USC IRB) as part of a larger set of studies operating out of the USC Transdisciplinary Tobacco Use Research Center (P50-CA84735–03).

A total of 495 students were invited to participate. Of the 495, nine students (1.8%) did not provide parental consent and six students (1.2%) were absent from school on the day of data collection. Of the remaining 480 students, 10 students were from Muslim but not Arab countries and nine students had missing values for gender. These were excluded from the analysis. This analysis reports the results for the remaining 461 students or 96% of the eligible population.

Measures of Smoking Variables

Questions from the California Tobacco Control Youth Survey that have been validated in previous studies (California State Department of Health Services Cancer Surveillance Section 1998) were used in this survey. Because of Islamic issues, questions pertaining to alcohol and substance use, besides tobacco, were eliminated. Additional questions pertaining to gender-specific norms and religious influences were developed and added to the survey. The additional questions were developed by having four Muslim Arab judges not associated with this study (two adults—one male and one female—and two adolescents—one male and one female) rate a list of items tapping into each of the above two constructs on a 1–4 rating scale, from 'Strongly unfavorable to the concept' to 'Strongly favorable to the concept'. Candidate items with item-total correlations of 0.6 or greater were included in the survey (Trochim 1999).

To ensure equivalence of meaning across the surveys, questions from the California survey were translated from English to Arabic, and then back translated from Arabic to English, by a group of bilingual professional personnel. The two versions were compared and modified until all translators agreed that the translation was accurate and that there was no disparity between the back-translated version of the questionnaire and the original survey versions. Students had the option of choosing either the English or the

Arabic versions of the survey. Of the 461 students participating in the survey, 186 (40%) chose to answer the English version.

Peer smoking. To determine exposure to peer smokers, respondents were asked: 'How many of your best friends smoke cigarettes?' Responses ranged from 1, denoting none of their friends smoked, to 6, denoting five or more of their friends smoked. Those who indicated that none of their best friends smoked were classified as unexposed to peer smokers and coded as '0'; all other responses were coded as '1'.

Perceived norms. Respondents were asked the following question to ascertain their perceived norms: 'Out of 100 students your age, how many do you think smoke cigarettes at least once a month?' Students had a response choice ranging from 1, indicating none, up to a response of 11 indicating 100%, with 10% increments.

Family smoking. Adolescents were asked about smokers in the family with the questions: 'Does your father smoke now?', 'Does your mother smoke now?', 'Do any of your siblings smoke now?' and 'Do any of your grandparents smoke now?' (alpha = 0.5). Respondents answered 'Yes' or 'No'. Negative responses to all four questions classified an adolescent as having no family exposure to smokers and was coded as '0'; all other responses were coded as '1'.

Family advice against smoking. Adolescents were asked the following two questions: 'Has your father ever expressed any desire for you not to smoke?' and 'Has your mother ever expressed any desire for you not to smoke?' Respondents answered 'Yes' or 'No' or 'I don't smoke'. Respondents who answered 'No' to both questions were considered experimenters who had not been exposed to any family advice against smoking, and were coded as '0'. Respondents who answered 'Yes' (experimenters who were exposed to family advice against smoking) and those who answered 'I don't smoke' were considered exposed to family advice against smoking and therefore did not smoke and were coded as '1'.

Perceived positive beliefs about smoking. Respondents were asked the following three questions: 'Do you think that smoking can help people relax?', 'Do you think smoking can help people reduce stress?' and 'Do you think smoking can help people when they are bored?' Responses were rated on a 4-point scale 'Yes definitely', 'Yes maybe', 'Probably not' and 'No' (alpha = 0.59). Responses were recoded such that higher numbers indicated higher positive beliefs about smoking. The belief about smoking scale was formed by summing the responses to the three items. Higher numbers indicated higher positive beliefs about smoking.

Perceived negative consequences of smoking. Students responded to the following statements: 'Smoking cigarettes makes teeth yellow', 'Smoking cigarettes makes people smell bad' and 'Smokers have shorter lives than non-smokers'. Responses were rated on a 4-point scale 'Yes definitely', 'Yes maybe', 'Probably not' and 'No' (alpha = 0.70). Responses were recoded such that higher numbers indicated higher perceived negative consequences. The perceived negative consequences scale was formed by summing the responses to the above three items. Higher numbers indicated higher perceived negative consequences for cigarette smoking.

Religious influence. Students responded to the following question: 'How effective do you think religious advice is in preventing youth from smoking?' Responses were rated on a 4-point scale 'Very effective', 'Somewhat effective', 'Not effective' and 'Not effective whatsoever'. Responses were recoded such that higher numbers indicated higher beliefs in the effectiveness of religious influence to prevent smoking.

Gender-specific norms. Students responded to two items 'Do you think it is socially acceptable for an adult man to smoke?' and 'Do you think it is socially acceptable for an adult woman to smoke?' ($\alpha = 0.66$). Respondents answered 'Yes' or 'No'. Respondents who indicated a 'Yes' for the male's question and a 'No' for the female's question were considered as having traditional gender-specific norms and were coded as '1'; all other response combinations were coded '0'.

Susceptibility to smoking. This was measured using three items based on the definition of susceptibility to smoking by Pierce *et al.* (1996): 'If one of your best friends offered you a cigarette, would you smoke it?', 'If a friend from the opposite sex offered you a cigarette, would you smoke it?' and 'Do you think that you will start smoking in the next year?' ($\alpha = 0.85$). Responses were rated on a 4-point scale 'Yes definitely', 'Yes maybe', 'Probably not' and 'No'. Respondents who answered 'No' to all three questions were classified as not susceptible to smoking and coded as '0'. Any other response led to the adolescent being categorized as susceptible to smoking and coded as '1'.

Experimentation with cigarettes (ever smoking). Respondents were asked: 'Have you ever tried cigarette smoking, even a few puffs?' Respondents answered 'Yes' or 'No'. Students who responded 'Yes' were classified as ever smokers and coded as '1', and those who responded 'No' were classified as non-smokers and coded as '0'.

Past 30 day smoking. Respondents were asked: 'Think about the last 30 days, on how many of these days did you smoke cigarettes?' Responses were coded on a 6-point scale ranging from 'I don't smoke' to 'All 30 days'. Respondents who answered 'I don't smoke' were classified as non-smokers and coded as '0' and respondents who answered '1-2 days', '3-9 days', '10-19 days', '20-29 days' and 'All 30 days' were classified as having smoked in the past 30 days and coded as '1'.

Covariates. Age was used as a covariate in all analysis. Sex was used as a covariate whenever there was no significant interaction between it and the independent variables under study, otherwise analyses were run separately for each gender.

Data Analysis

Descriptive statistics (frequencies, percentages and means) were used to examine smoking prevalence and age of respondents. Correlation analysis was used to examine the correlation of the independent and dependent variables under study. Chi-square analyses were used to compare the prevalence of susceptibility, ever smoking, 30 day smoking and current smoking across genders; *t*-test analyses were used to compare the mean age across genders.

Multiple logistic regression analysis was used to assess the associations between the independent and dependent variables. Two separate regression models were run, one with ever smoking as the dependent variable and one with susceptibility as the dependent variable. Independent variables not correlated with ever smoking or susceptibility to

smoking were not included in the models for that dependent variable. Both dependent variables were dichotomized. Each model included main effects of all the variables under study, sex and the interaction terms of the independent variables with sex. Whenever there was a significant interaction with sex, the model was reanalyzed for each gender. All models were controlled for age.

All statistical analysis was completed using the SAS system version 8 (SAS Institute 1999). All variables used in this study were recoded according to the definitions specified in the measures section of this study before statistical analysis and computation were performed.

RESULTS

Demographic Characteristics of the Sample

The population sample was comprised of approximately 46% males and 54% females. The age of the students ranged from 12 to 19 years, with a mean age of 15.3 (SD = 1.76) years; *t*-tests revealed no significant difference in the mean age of respondents between the sexes ($t = 0.06$, $df = 459$, $p = 0.956$).

Muslim Arab-Americans from different Arab countries represent an ethnic group with a large internal diversity; therefore, subgroups of Arab ethnicities were distinguished in order to study the differences in their smoking patterns. Of the sample surveyed, 192 (42%) were Saudi Arabians, 36 (8%) Egyptians, 35 (8%) Palestinians, 34 (7%) Yemenis, 9 (2%) referred to themselves as Arab-Americans without giving their country of origin, 102 (22%) had missing values for their ethnic background and 53 (11%) were from 11 different Muslim Arab countries, including the Arab Emirates 9 (2%), Kuwait 10 (2%), Lebanon 7 (2%), Syria 6 (1%), Iraq 6 (1%), Sudan 6 (1%), with Algeria, Libya, Morocco and Tunisia comprising the remaining 1% of the student population. Because small sample sizes would not allow adequate statistical analysis and comparisons, students from Arab countries that individually represented 2% or less of the total sample ($n \leq 10$) were grouped together as an 'Other' Arab group. Subjects with missing values for their ethnic groups were also included in the 'Other' Arab group.

Smoking Prevalence

Chi-square analysis revealed no significant difference in the smoking rates (ever, 30 day and current) and susceptibility to smoking, between students who chose to answer the English questionnaire version (40%) and those who chose to answer the Arabic version ($p > 0.05$). The overall prevalence of susceptibility to smoking, ever smoking ('Ever smoked a few puffs'), 30 day smoking ('Smoked in the last 30 days') and current smoking ('Daily smokers') was approximately 50%, 45%, 18% and 12%, respectively. Figure 1 presents the prevalence of smoking rates for males and females enrolled in the Academy. Chi-square analysis revealed that males had significantly higher susceptibility ($\chi^2 = 47.16$, $df = 1$, $p < 0.0001$), ever smoking ($\chi^2 = 36.62$, $df = 1$, $p < 0.0001$), 30 day smoking ($\chi^2 = 52.82$, $df = 1$, $p < 0.0001$) and current smoking rates ($\chi^2 = 29.75$, $df = 1$, $p < 0.0001$) than females.

Approximately 67% of the susceptible subjects had ever smoked, while approximately 23% of non-susceptible subjects had ever smoked. Chi-square analysis revealed a significant difference between susceptible and non-susceptible respondents and ever smoking behavior ($\chi^2 = 95.0$, $df = 1$, $p < 0.0001$).

Figure 2 presents the overall (both genders) ever, 30 day and current smoking rates for the different Arab ethnicities. The Saudi Arabian students appeared to have the highest ever, 30 day and current smoking rates (51%, 26% and 18%, respectively), while the Yemenis had the lowest (29%, 3% and 3%, respectively). Saudi males had higher

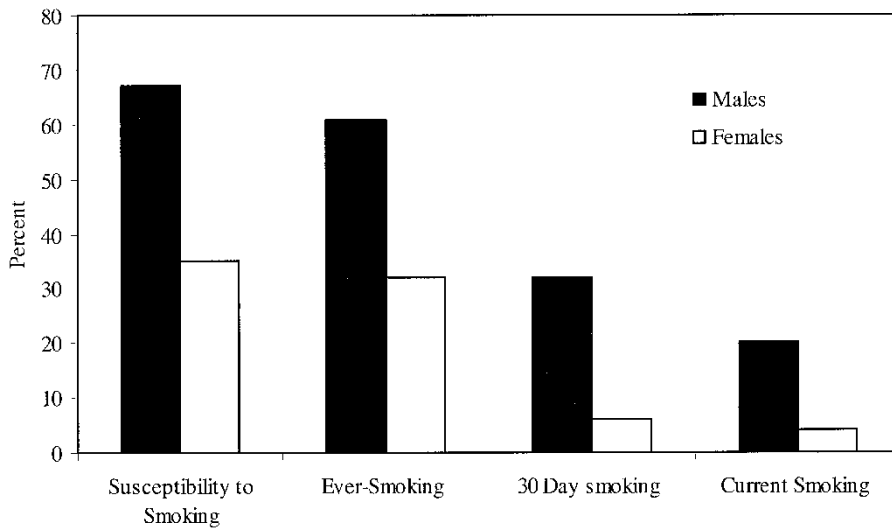


FIGURE 1. Susceptibility, ever-smoking, 30 day smoking and current smoking rates by gender among Muslim Arab-American students in an Islamic Academy in Fairfax County, Virginia, 1999 [N = 461].

ever, 30 day and current smoking rates (70%, 47% and 32%, respectively) than Saudi females (33%, 6% and 5%, respectively). Chi-square analysis, by gender, for each ethnic group revealed a statistically significant difference between the sexes for the Saudi Arabians, where males had significantly higher ever smoking rates ($\chi^2 = 26.26$, $df = 1$, $p < 0.0001$), 30 day smoking rates ($\chi^2 = 41.7$, $df = 1$, $p < 0.0001$) and current smoking rates ($\chi^2 = 23.13$, $df = 1$, $p < 0.0001$) than the females. A similar statistically significant difference between genders was found for the 'Other' Arab ethnic group, where males had significantly higher ever smoking rates ($\chi^2 = 11.13$, $df = 1$, $p = 0.0009$), 30 day smoking rates ($\chi^2 = 9.38$, $df = 1$, $p = 0.002$) and current smoking rates ($\chi^2 = 3.83$, $df = 1$, $p = 0.05$) than the females.

Figure 3 presents a comparison of the 30 day smoking rates of the study sample with a representative sample population of American adolescents of the same grade, from the University of Michigan's Monitoring the Future Project (Johnston *et al.* 1998). The Monitoring the Future Project examines a wide variety of substance use behaviors, attitudes and perceptions of middle and high school students surveyed annually in a sample of about 15,000–18,000 students per year (Johnston *et al.* 1998) and is therefore representative of the national US middle and high school populations.

Muslim Arab-Americans had consistently lower 30 day smoking rates than American whites and consistently higher 30 day smoking rates than blacks of the same grade. Muslim Arab-Americans in the 8th grade appear to have lower smoking rates than Hispanics of the same grade, but by the 10th and 12th grades the smoking rates of these two ethnic groups appear to be very similar (see Figure 3).

Correlations between Variables under Study

Table 1 shows the Pearson correlation coefficients of the variables under study. Family smoking behavior and family advice against smoking were not significantly correlated ($p > 0.05$) with ever smoking and therefore were not included in the model with ever smoking as the dependent variable.

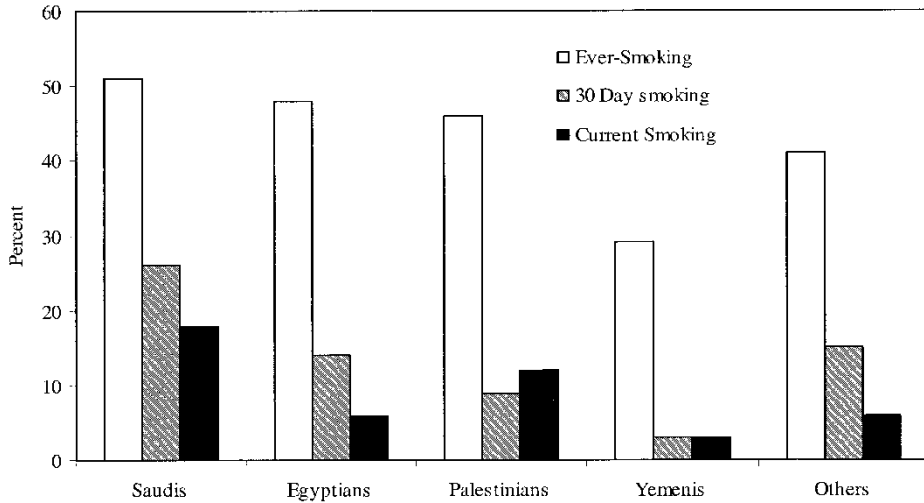


FIGURE 2. Ever-smoking, 30 day smoking and current smoking rates by Arab ethnic group among Muslim Arab-American students in an Islamic Academy in Fairfax County, Virginia, 1999 [N = 461].

Main Effects Associated with Ever Smoking

Table 2 presents the odds ratios and 95% confidence intervals (CIs) for the independent smoking variables investigated with ever smoking. There were no significant interactions between sex and any of the variables under study on ever smoking. Peer smoking ($\beta = 1.099, p < 0.0001$), peer norms ($\beta = 0.123, p = 0.0008$), positive beliefs about smoking ($\beta = 0.103, p = 0.02$) and being male ($\beta = 0.564, p = 0.015$) were

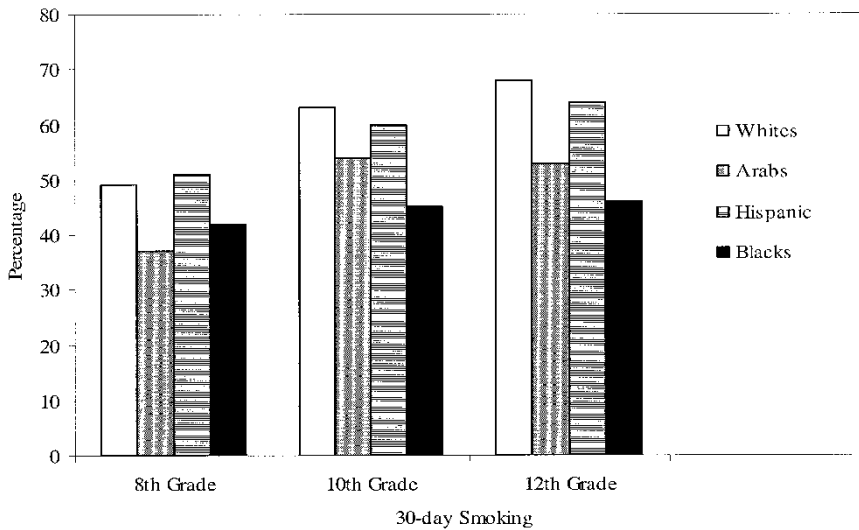


FIGURE 3. Comparison of 30 day smoking rates between American whites, blacks and Hispanics in the 8th, 10th and 12th grades, from the Monitoring the Future Study, 1996-97, and Muslim Arab-American students in an Islamic Academy in Fairfax County, Virginia, 1999.

TABLE 1. Pearson's correlation coefficients for the variables under study

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1 = Susceptibility	1.00									
V2 = Ever smoking	0.45 ^a	1.00								
V3 = Family smoking	0.17 ^a	0.05	1.00							
V4 = Family advice	-0.14 ^a	-0.08	-0.002	1.00						
V5 = Peer smoking	0.42 ^a	0.39 ^a	0.17 ^a	-0.12 ^a	1.00					
V6 = Peer norms	0.23 ^a	0.31 ^a	0.08	-0.02	0.26 ^a	1.00				
V7 = Religious influence	-0.23 ^a	-0.16 ^a	-0.13 ^a	0.07	-0.11 ^a	-0.16 ^a	1.00			
V8 = Positive beliefs	0.34 ^a	0.28 ^a	0.14 ^a	-0.09 ^a	0.28 ^a	0.21 ^a	-0.19 ^a	1.00		
V9 = Negative consequences	-0.37 ^a	-0.24 ^a	-0.12 ^a	0.17 ^a	-0.23 ^a	-0.12 ^a	0.17 ^a	-0.18 ^a	1.00	
V10 = Gender-specific norms	0.16 ^a	0.15 ^a	0.08	-0.04	0.11 ^a	0.08	0.01	0.13 ^a	-0.13 ^a	1.00

^a $p < 0.05$.

TABLE 2. Logistic regression analysis predicting ever smoking for both genders

Independent variable	OR	(95% CI)
Peer smoking	3.0	(1.89–4.75) ^a
Peer norms	1.13	(1.05–1.22) ^a
Perceived negative consequences	0.81	(0.74–0.89) ^a
Positive beliefs about smoking	1.11	(1.02–1.21) ^a
Religious influence	0.72	(0.57–0.92) ^a
Gender-specific norms	1.43	(0.87–2.33)
Sex ^b	1.76	(1.12–2.77) ^a
Age	1.03	(0.95–1.12)

^a $p < 0.05$.^b Being male vs female.

significantly associated with an increased risk of ever smoking. Negative consequences of smoking (beta = -0.209, $p < 0.0001$) and religious advice (beta = -0.323, $p = 0.008$) were significantly associated with a decreased risk of ever smoking.

Main Effects Associated with Gender Susceptibility

To investigate gender susceptibility and all independent variables, the model was analyzed by gender, adjusting for all other variables under study. Results of the logistic regression predicting gender susceptibility are shown in Table 3.

The main effects of peer smoking and positive beliefs about smoking were significantly associated with a greater risk of susceptibility to smoking for both genders, while the main effect of perceived negative consequences was significantly associated with a decreased risk of susceptibility to smoking for both genders (see Table 3).

Interaction effects with gender were found for the religious influence and gender-specific norms (socially acceptable for men to smoke, but not for women to smoke) variables. Religious influence was a protective factor against susceptibility to smoking for girls (beta = -0.59, $p = 0.002$) but not for boys ($p > 0.05$), while gender-specific norms were a risk factor for male susceptibility to smoking (beta = 1.05, $p = 0.02$) but not for females. Gender-specific norms had a protective effect against susceptibility to

TABLE 3. Differential effect of independent variables on susceptibility to smoking, by gender

	Males		Females	
	OR	(95% CI)	OR	(95% CI)
Peer smoking	4.5	(2.1–9.6) ^a	2.0	(1.1–3.8) ^a
Family smoking	1.2	(0.6–2.5)	1.4	(0.7–2.5)
Family advice	0.3	(0.1–1.0)	1.1	(0.4–2.6)
Peer norms	1.0	(0.9–1.2)	1.1	(0.9–1.2)
Perceived negative consequences	0.7	(0.6–0.9) ^a	0.8	(0.7–0.9) ^a
Positive beliefs about smoking	1.2	(1.1–1.4) ^a	1.3	(1.2–1.5) ^a
Religious influence	1.0	(0.7–1.5)	0.6	(0.4–0.8) ^a
Gender-specific norms	3.1	(1.3–7.2) ^a	0.9	(0.5–1.2)
Age	1.1	(0.9–1.3)	1.1	(0.9–1.2)

^a $p < 0.05$.

smoking for females; however, this effect did not reach statistical significance ($\beta = -0.008$, $p = 0.9$; see Table 3).

Family smoking, family advice against smoking and peer norms were not significantly associated with susceptibility to smoking for either gender.

DISCUSSION

Smoking rates reported in this survey are much higher than those previously reported by other researchers for the different ethnic groups of Arab youth (Soueif *et al.* 1980, 1985; Zahran *et al.* 1982; Jarallah *et al.* 1996). One reason for this discrepancy could be the underreporting of smoking behavior from previous research carried out in Saudi Arabia. As mentioned above, smoking is not religiously forbidden in Saudi Arabia; however, it is considered a hated behavior and is frowned upon, especially among the youth. Smoking prevalence surveys in Saudi Arabia are usually administered by the home-class teachers (Rowland and Shipster 1987; Felimban and Jarallah 1994; Al-Faris 1995; Jarallah *et al.* 1996), and assurances of anonymity to the students are therefore usually met with suspicion. Saudi youth may deny any substance use, including tobacco use, for fear of entrapment and punishment from the school authorities for practicing a religiously hated behavior. However, students surveyed in this study were less suspicious and more comfortable answering questions regarding their smoking behavior. They were aware of the research reasons for the survey, had personally consented to participate, were assured of anonymity and confidentiality and the survey was administered by a trained person unknown to them. Another reason for these higher smoking rates could be the fact that the Saudi males from this study were living in the USA and acculturated to the American way of life, where the smoking rates of American youth are much higher (California State Department of Health Services Cancer Surveillance Section 1998).

There appeared to be similarities and variations in the associations between factors influencing susceptibility to smoking and those influencing experimentation for this sample of Muslim Arab-American adolescents. Specifically, peers' smoking was strongly associated with adolescents' susceptibility and experimentation with cigarettes for both genders, while perceived peer norms (prevalence estimate of peer smoking) were associated only with experimentation. Peers' smoking appeared to exert a stronger influence on adolescents' susceptibility and experimentation than any other risk factors under study. This is consistent with the results of other studies that found that peers' smoking behavior has the strongest influence on adolescents' smoking behavior (Hansen *et al.* 1987; Conrad *et al.* 1992; Biglan *et al.* 1995). The influence of perceived peer norms in encouraging adolescents to smoke seems to be most effective after first experimentation, rather than influencing the adolescents' susceptibility to experiment for the first time. Adolescents who have already experimented with smoking might feel a need to overestimate the prevalence of their peer smoking in an effort to rationalize their own smoking behavior.

Positive beliefs about smoking remained significantly associated with both susceptibility and experimentation for both genders. Adolescents who perceived positive benefits from smoking were more likely to be susceptible to smoking and experiment with cigarettes than those who did not perceive positive benefits from smoking. In order to reduce adolescents' susceptibility to smoking and experimentation with cigarettes, both of which are necessary stages in the smoking uptake process, the correction of perceived positive beliefs associated with smoking needs to be incorporated in any smoking prevention program aimed at youth from any ethnic background.

Perceived negative consequences significantly protected adolescents from susceptibility and experimentation. The negative consequences index included items reflecting both the short-term consequences and the long-term effects of smoking. Adolescents who

believed that smoking would make people smell bad, make their teeth yellow and have shorter lives than non-smokers were less likely to be susceptible to smoking and to experiment with cigarettes than adolescents who did not believe in these negative consequences. Previous studies have shown that messages emphasizing the immediate consequences rather than the long-term effects of smoking on health have a higher impact on smoking behavior (Creswell *et al.* 1971; Flay *et al.* 1983); however, for this sample it appears that emphasizing both the short- and long-term negative consequences of smoking is protective against susceptibility to smoking and experimentation with cigarettes.

Consistent with previous studies, being male was significantly associated with an increased risk of susceptibility and experimentation (Brownson *et al.* 1992; Centers for Disease Control and Prevention 2000). This is not surprising since, culturally, Muslim Arab males are encouraged to spend more of their free time with their peers and are not as strictly supervised by their parents as are Muslim females (Al Ansari 1996), and are therefore more susceptible to peer influences. Also, Muslim Arab males might perceive that smoking helps increase their masculine image among their peers and make them appear more mature. On the other hand, Muslim Arab females might perceive that smoking affects their feminine Islamic image and reputation, thus affecting their prospects of a good marriage, and therefore be less susceptible to smoking and experimentation.

Cultural and religious factors investigated in this study appear to have a significant influence on adolescents' smoking behavior. Traditional gender-specific norms as defined in this study, where adolescents believed that it is socially acceptable for males, but not for females, to smoke, were significantly associated with an increased risk of susceptibility for males, but not for females. It is not surprising that adolescent males who believed in this traditional concept would be more susceptible to smoking, since they perceive it is an acceptable social behavior. However, as the male adolescent progresses to the experimentation stage, the traditional gender-specific norms factor is no longer associated with the risk of ever smoking. At this point, other factors appear to have stronger influences on adolescents' experimentation with smoking; specifically, peer smoking behavior, peer norms and positive beliefs about smoking.

The belief in the effectiveness of religious advice against smoking, which may be a reflection of the adolescent's degree of religiosity (extent of adherence, commitment and practice of religious teachings), appeared to be protective against experimentation with cigarettes for both genders, though it was protective against susceptibility to smoking only for the females. This may be a reflection of the adolescents' degree of religiosity; such that the higher their religious commitment is the more protective religious advice would be against susceptibility to smoking and experimentation with cigarettes. This finding supports previous studies from the USA, Europe and Israel that have shown that high levels of religiosity are associated with lower smoking rates among adolescents (Kandel *et al.* 1981; Heath *et al.* 1999; Sperber *et al.* 2001; Sutherland and Shepherd 2001; Atkins *et al.* 2002). Further research on the degree of religiosity and its association with smoking behavior among Muslim youth is needed to investigate the extent of its protective effect in the smoking uptake process. Religion may be in a position to be an effective public health partner in the fight against the tobacco epidemic among the adolescent population. Islamic messages denouncing smoking and describing the health risks associated with it could reinforce the perceived negative consequences of smoking while decreasing the positive beliefs about smoking. Therefore, including a religious perspective on smoking in prevention programs aimed at Muslim adolescents may be beneficial to protect them from progressing to habitual smoking.

It is of interest that the overall Arab-Americans' 30 day smoking rates were similar to those of Hispanic Americans, especially in the 10th and 12th grades. Arabs and Hispanics share similar cultural values such as differentiated gender roles and stricter

religious upbringing (Adrados 1995; Cuellar *et al.* 1995; Canals *et al.* 1997), which may have similar effects in terms of the initiation and/or prevention of smoking in these cultures.

Interestingly, although this sample of adolescents comes from a culture that could be described as 'collectively oriented' (Abd Al Hameed and Al Sheikh 1978; Fernea 1991; Ingram 1999), family smoking behavior and family advice against smoking were not significantly correlated with experimentation with cigarettes. And although family smoking behavior and family advice against smoking were significantly correlated with susceptibility (positively and negatively, respectively), their association in predicting susceptibility to smoking for either gender was insignificant after controlling for other smoking variables. Other studies have found that adolescents from collective cultures might be less affected by their peer smoking behavior and more affected by their parents' and adult smoking behavior and social norms (Unger *et al.* 2001). One explanation might be that the sample size in this study was not sufficient to demonstrate a statistically significant effect for these factors. Another explanation might be the confounding effect of acculturation for the sample under study. Respondents who are more acculturated might be influenced by risk factors normally associated with the smoking behavior of American white adolescents, such as the influence of peer smoking and peer norms (Kandel 1975; Chassin *et al.* 1984; Kumpfer and Turner 1990; Wang *et al.* 1995). Unfortunately, this study did not investigate the degree of acculturation of the respondents.

The results of this study point to the notion that some known smoking risk factors could be considered universal, while others are more culture specific. Further longitudinal studies on the effects of known risk factors, and cultural and religious influences on the smoking behavior of adolescents from Middle Eastern cultures, are necessary to understand the degree of influence of each of these factors on adolescents at different stages of the smoking uptake process. Understanding the differential effects of these factors would aid us in the design of effective and more appropriate smoking prevention programs aimed at our target ethnic group.

Limitations

The results of this study are based on students' self-reports of their smoking behavior. Although respondents were assured of their anonymity, they may have underreported their smoking behavior, especially the females, in an attempt to appear socially correct. Though adolescents' self-reports of smoking obtained under similar conditions have been shown to be quite accurate across ethnic groups in the USA (Wills and Cleary 1997), it is not known whether this is also true for Muslim Arab-American adolescents.

Another concern lies in comparing data from this study with those of the USA. It is probable that Arab-Americans were participants in these studies but were not identified separately as were whites, blacks and Hispanics. Arab-Americans have been referred to as a 'non-legal' ethnic minority (Abraham and Abraham 1981, 1983). When defining eligibility requirements for specific government programs, federal and local governments overlook them and, as a consequence, data for this population are usually included with that of other white Americans (Abraham and Abraham 1981, 1983).

The results are also based on cross-sectional data, so causal influences cannot be determined. The reverse direction of casualty is plausible. For example, adolescents who have experimented with smoking and/or are susceptible to smoking might choose to have friends who smoke and not vice versa. More longitudinal study designs are required in order to develop a better understanding of the conditions under which these variables operate as causal factors.

Acculturation had not been measured in this study, and therefore may have confounded some of the results, and the significance and/or insignificance of the association

of the factors investigated may have been different if acculturation had been controlled for. Future studies among any ethnic group in the USA should incorporate acculturation measures and adjust for it in order to accurately establish the smoking risk factors associated with any ethnic group.

The results are based on a sample of middle and high school students attending one Islamic school in Fairfax County, Virginia, and thus cannot be generalized to the rest of the Muslim Arab-American adolescent population. Variables found to be significantly associated with smoking behavior may differ for other Muslim Arab-American adolescents in other geographical areas, especially if they attend more ethnically integrated American schools where they might be exposed to values from other cultures.

Implications

Despite these limitations, these results provide important new information about the correlates of Muslim Arab-American adolescents' smoking behavior. Smoking prevention programs aimed at this group should emphasize the negative consequences of smoking, both short and long term; incorporate religious messages that emphasize that smoking is not an acceptable behavior in Islam and is socially unacceptable for either gender; encourage the incorporation of the positive aspects of traditional gender roles into their lives while avoiding the negative ones; and correct the erroneous perception of the social acceptability of male smokers.

ACKNOWLEDGEMENTS

This study was supported by the National Cancer Institute/National Institute of Drug Abuse Transdisciplinary Tobacco Use Research Center grant (1 P50 CA84735-03) awarded to the University of Southern California. Sondos Islam was supported by a doctoral scholarship from the Saudi Arabian Educational Mission to the USA.

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